

1     **CLAIMS**

2     **What is claimed is:**

3     1. A channel merging method for a VOD system, wherein said method comprising the steps of:

4         (1) in response to requests from a plurality of clients for a video program, establishing a  
5             root channel (S1) and at least one sub-channel (S11), said root channel (S1) being  
6             established according to a request from a client that makes an earliest request, each of  
7             said sub-channels (S11) being established corresponding to a request of a client that  
8             makes a later request;

9         (2) monitoring variation of a number of the clients that are using each established  
10            channel, and maintaining the established channel if the number of the clients using a  
11            monitored channel is not zero, and closing the established channel if the number of the  
12            clients using the monitored channel becomes zero.

13     2. The channel merging method according to claim 1, wherein said root channel (S1) and each of  
14     said sub-channels are established in response to one of: a play starting request, and a program  
15     jumping request from a client.

16     3. The channel merging method according to claim 1, wherein said root channel and said  
17     sub-channels form a tree structure.

18     4. The channel merging method according to claim 1, wherein said step (2) includes the  
19     sub-steps of:

20         (2-1) indicating the number of clients that are using each channel as a count parameter;

21         (2-2) decreasing the value of said count parameter in response to occurrence of the event  
22             of merging, jumping or stopping of said each channel and sub-channels thereof;

23         (2-3) closing said channel on the server side if the value of said count parameter becomes  
24             zero.

1           5. The channel merging method according to claim 4, wherein said channel is maintained  
2 on the server side if the value of said count parameter is not zero, and said clients having  
3 performed the event of merging, jumping or stopping no longer receive the programs being  
4 played on said channel.

5           6. The channel merging method according to claim 1, wherein said step (1) includes the  
6 sub-steps of:

7           (1-1) searching a collection of root channels (S1) into which said sub-channels (S11) is  
8 possibly merged for a root channel (S1), said root channels (S1) satisfying the  
9 condition of  $\min(S11.start\_time - S1.start\_time) < object\_length/2$ , wherein the  
10  $\min(S11.start\_time - S1.start\_time)$  indicates minimal values of the difference  
11 between the start time of said sub-channels (S11) and the start time of each root  
12 channel in said collection, and the  $object\_length/2$  indicates the half of the total  
13 length of the played video program;

14           (1-2) if said root channel (S1) exists, searching a collection of posterity channels of said  
15 root channel (S1) for a parent channel (S6) into which said sub-channel (S11) will  
16 be merged, said parent channel satisfying the condition of  
17  $\min(S11.start\_time - S6.start\_time) < S6.start\_time - S5.start\_time$ , wherein  
18  $S6.start\_time$  indicates the start time of said parent channel (S6), and  $S5.start\_time$   
19 indicates the start time of a parent channel (S5) of said parent channel (S6);

20           7. The channel merging method according to claim 6, wherein if said root channel (S1) is  
21 not found in step (1-1), said sub-channel (S11) is taken as a new root channel, its root channel  
22 parameter is set to be 1 and said sub-channel (S11) is the only channel being watched by said  
23 client.

24           8. The channel merging method according to claim 6, wherein if said parent channel is  
25 found in step (1-2), said client watches the video program both on said sub-channel (S11) and  
26 said parent channel.

27           9. The channel merging method according to claim 6, wherein if said parent channel is not  
28 found in step (1-2), the found root channel is taken as the parent channel of said sub-channel  
29 (S11), and said client watches the video program both on said sub-channel (S11) and said root  
30 channel.

1           10. The channel merging method according to claim 2, wherein if said client's request at  
2 time t is a starting request, a start time parameter is set to be t and an object offset parameter is  
3 set to be 0 in the sub-channel (S11).

4           11. The channel merging method according to claim 2, wherein if said client's request at  
5 time t is a jumping request, and the object offset time of said jumping is s, a start time parameter  
6 is set to be t and an object offset parameter is set to be s in the sub-channel (S11), and

7           a stopping operation is performed on the channel on which said video program is played at  
8 time t and has been received by the client.

9           12. The channel merging method according to claim 5, wherein if said stopping operation  
10 is due to the ending of said video program, said sub-channel is directly closed and all the  
11 resources of said sub-channel are released.

12           13. The channel merging method according to claim 6, wherein when secondary  
13 sub-channels of said sub-channel (S11) are established, steps (1-1) and (1-2) are repeated to take  
14 said sub-channel (S11) as the parent channel of the secondary sub-channels, and the value of the  
15 count parameter of said sub-channel (S11) is increased by 1.

16           14. A channel merging apparatus for a VOD system, said channel merging apparatus is  
17 disposed in a video server in said VOD system or connected to the same operatively, said  
18 channel merging apparatus comprises:

19           a channel selecting unit for establishing a root channel (S1) and at least one sub-channel  
20 (S11) in response to requests from a plurality of clients for a video program, said root channel  
21 (S1) being established according to a request from a client that makes the earliest request, each  
22 of said sub-channels (S11) being established in response to a request from a client that makes a  
23 later request;

24           a channel control unit for monitoring variation of the number of the clients that are using  
25 each of said established channels, and maintaining the channel if the number of the clients using  
26 the monitored channel is not zero, and closing the channel if the number of the clients using the  
27 monitored channel becomes zero.

28           15. The channel merging apparatus according to claim 14, wherein said channel control  
29 unit further comprises:

1 a count unit for indicating the number of clients using each channel as a count parameter;  
2 wherein said count unit decreases the value of said count parameter in response to  
3 occurrence of the event of merging, jumping or stopping of said each channel and sub-channels  
4 thereof; and closes said channel on server side if the value of said count parameter becomes  
5 zero.

6 16. The channel merging apparatus according to claim 15, wherein if the value of said  
7 count parameter is not zero, said channel is maintained on the server side, and said clients  
8 having performed the event of merging, jumping or stopping no longer receive the programs  
9 being played on said channel.

10 17. An article of manufacture comprising a computer usable medium having computer  
11 readable program code means embodied therein for causing merging for a VOD system,, the  
12 computer readable program code means in said article of manufacture comprising computer  
13 readable program code means for causing a computer to effect the steps of claim 1.

14 18. A program storage device readable by machine, tangibly embodying a program of  
15 instructions executable by the machine to perform method steps for merging for a VOD system,  
16 said method steps comprising the steps of claim 1.

17 19. A computer program product comprising a computer usable medium having computer  
18 readable program code means embodied therein for causing merging for a VOD system, the  
19 computer readable program code means in said computer program product comprising computer  
20 readable program code means for causing a computer to effect the functions of claim 14.

21 20. A channel merging method for a VOD system, said method comprising  
22 creating a new channel S11, and setting corresponding parameters;  
23 determining if a parent channel of the channel S11 exists;

24 if not, taking channel S11 as a new root channel, which acts as the

25 only channel to be watched by the client;

26 if yes, the client watches the channel S11 and its parent channel

27 simultaneously, and

28 sending operation information to the client to respond to a starting request from  
29 the client